H-Max Series Drives

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Product Overview

Drives

Eaton's H-Max™ Series VFD is the next generation of drives specifically engineered for HVAC, pump and fluid control applications. Installation, startup and maintenance are world-class with a combination of ultra-efficient power section and programmable main control board.

H-Max Series has an expanded startup wizard for HVAC system configuration, which provides the flexibility to meet consultants, OEM and end-user requirements.

Features

- Integrated DC link choke standard on drives from FS4–FS9
- DC bus regulation anti-trip
- Input surge protection against voltage spikes varistor input
- HAND/OFF/AUTO and DRIVE/BYPASS selector on keypad simplifies control
- Additional I/O and communication cards provide plug-and-play functionality
- **Keypad**—copy/paste function allows transfer of parameter settings from one drive to the next
- **Battery Backup**—real-time clock with PLC functionality
- Two independent PID functions
- Multimonitor up to nine values
- 110% overload for one minute once every ten minutes
- EMC Category 2
- Standard EMI/RFI filter
- Conformal coated boards
- Troubleshooting diagnostics
- Onboard RS-485 (Modbus, N2, FLN, BACnet)
- Onboard Ethernet-based communications (BACnet/IP, Modbus/TCP
- Separate conduit plate allows access to control and power connections
- DB chopper standard frames FS4–FS6 for
  - 1.5–40 hp, 1.1–30 kW 3.4–61 amp, 480 Vac
  - 0.75–20 hp, 0.55–15 kW, 3.7–62 amp, 200–240 Vac
- OHSPD Special Seismic Certification Pre-Approved
- UL 508C

IntelliPass and IntelliDisconnect Drives

Eaton's ultra-reliable IntelliPass/IntelliDisconnect drives are designed with the latest HVAC software and hardware features. The IntelliPass integrates electronic (***XT***) bypass with optional manual override switch, which allows the unit to run in bypass without the H-Max Series drive.

The IntelliDisconnect uses Eaton's world-class (***XT***) MMP (manual motor protector) with optional output contactor.

Features

IntelliPass/IntelliDisconnect

- Circuit breaker provides flexible drive isolation configurations to meet customers' needs
- Robust steel enclosure for simple installation

IntelliPass

- Mechanical, electronic and damper interlocks
- Fire mode
- Monitored and controlled by onboard communication
- Two contactor, mechanically interlocked and fully rated bypass
- Single keypad with HAND/OFF/AUTO and DRIVE/BYPASS simplifies startups and control
- Two power sources for control ensure redundancy and provide additional ride-through capability
- NEMA Type 1
- Programmable auto restart and auto bypass while allowing critical damper interlock functionality

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H-Max Drives

Product Description

Eaton's H-Max Series VFD has software and hardware designed specifically for the HVAC, pump industry. The ultra-efficient DC capacitor and power structure allows the drive to consume less energy, lowering greenhouse gases.

The I/O configuration is designed with wiring ergonomics in mind by including removable terminal blocks. The main, easily removable, control board used for all drive frames with six digital IN, two analog IN, one analog OUT, three relay OUT accepts two additional I/O or communication board. In addition, the control board has built-in RS-485 and Ethernet communication.

These drives continue the tradition of robust performance, and raise the bar on features and functionality, ensuring the best solution at the right price.

Features and Benefits

- Integrated DC link choke standard on drives from FS4 through FS9
- DC bus regulation anti-trip
- Input surge protection against voltage spikes varistor input
- EMI/RFI filters standard on all drives from FS4 through FS9 to meet EMC Category 2
- HAND/OFF/AUTO and DRIVE/BYPASS selector on keypad simplifies control
- Additional I/O and communication cards provide plug-and-play functionality
- Copy/paste function allows transfer of parameter settings from one drive to the next
- Keypad can display up to nine monitored parameters simultaneously
- Remote mount keypad kit available
- NEMA Type 1 and NEMA Type 12 available
- Real-time clock with PLC functionality
- Two independent PID functions
- On-screen troubleshooting diagnostics with embedded manual assistance
- Onboard RS-485 (Modbus, N2, FLN, BACnet)
- Onboard Ethernet-based communications (BACnet/IP, Modbus/TCP
- Standard NEMA Type 12 keypad on all drives
- Quickstart wizard built into programming of drive ensures a smooth startup
- I/O connections with simple quick connection terminals
- Control logic can be powered from an external 24V power supply to simulate internal drive functions and fieldbus, if necessary, used for testing and software downloads
- Standard I/O,6DI, 2AI, 1AO 2 Form C RO (NO/NC), 1 Form A RO (NO)
- Hard wired external/ damper interlock

Standards and Certifications

Product

- IEC 61800-5-1
- CE
- cUL

Safety

- UL 508C
- EN 61800-5-1
- CE
- cUL

- OHSPD Special Seismic Certification Pre-Approved

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Catalog Number Selection

H-Max Series Drives

HMX 3 4 A G 3D4 2 1 - B Build options alphabetically and numerically. _ _ _ _ _ _

Product
HMX = HVAC drive

Phase
3 = Three-phase

Voltage
2 = 200–240V
4 = 380–480V

Software Series
A–Z

Keypad
G = Graphical panel

Input Options Frame and Voltage Specific
2 = EMC C2

Braking/Application
N = No brake chopper (low overload)
B = Internal brake chopper (low overload FS4–FS6 included)

Enclosure
1 = Open NEMA Type 1 IP21
2 = Open NEMA Type 12 IP54

Extended I/O Options in Slot D and E
B1 = 6 x DI /DO, Each digital input can be individually programmed as digital output
B2 = 1RO (NC/NO), 1RO (NO), 1 Thermistor
B4 = 1 x AI, 2 x AO (isolated)
B5 = 3 x RO
B8 = 1 ext +24 Vdc/ext +24 Vdc, 3 Pt100
B9 = 1RO (NO), 5 DI 42–240 Vac input

Optional Communications in Slot D and E
C4 = LonWorks®

Standard Onboard Communications

RS-485 Communications

BACnet MS/TP = Master slave/token protocol (Universal BACnet) RS-485
Modbus RTU RS-485, ASCII or RTU, remote terminal unit 32 nodes
FLN Siemens APOGEE FLN (P1) ASCII or RTU, remote terminal unit 32 nodes
N2 = Johnson Controls Metasys N2 network

Onboard Ethernet-Based Communications (port left side of keypad)

BACnet/IP Ethernet industrial protocol
Modbus/TCP Transmission control protocol (Ethernet-based)

Amperes

200–240 Volts	380–480 Volts
3D7 = 3.7A—0.75 hp, 0.55 kW ①	**3D4** = 3.4A—1.5 hp, 1.1 kW ①
4D8 = 4.8A—1 hp, 0.75 kW ①	**4D8** = 4.8—2 hp, 1.5 kW ①
6D6 = 6.6A—1.5 hp, 1.1 kW ①	**5D6** = 5.6A—3 hp, 2.2 kW ①
8D0 = 8A—2 hp, 1.5 kW ①	**8D0** = 8A—4 hp, 3 kW ①
011 = 11A—3 hp, 2.2 kW ①	**9D6** = 9.6A—5 hp, 4 kW ①
012 = 12A—4 hp, 3 kW ①	**012** = 12A—7.5 hp, 5.5 kW ①
018 = 18A—5 hp, 4 kW ①	**016** = 16A—10 hp, 7.5 kW ①
024 = 24A—7.5 hp, 5.5 kW ①	**023** = 23A—15 hp, 11 kW ①
031 = 31A—10 hp, 7.5 kW ①	**031** = 31A—20 hp, 15 kW ①
048 = 48A—15 hp, 11 kW ①	**038** = 38A—25 hp, 18.5 kW ①
062 = 62A—20 hp, 15 kW ①	**046** = 46A—30 hp, 22 kW ①
075 = 75A—25 hp, 18.5 kW	**061** = 61A—40 hp, 30 kW ①
088 = 88A—30 hp, 22 kW	**072** = 72A—50 hp, 37 kW
105 = 105A—40 hp, 30 kW	**087** = 87A—60 hp, 45 kW
140 = 140A—50 hp, 37 kW	**105** = 105A—75 hp, 55 kW
170 = 170A—60 hp, 45 kW	**140** = 140A—100 hp, 75 kW
205 = 205A—75 hp, 55 kW	**170** = 170A—125 hp, 90 kW
261 = 261A—100 hp, 75 kW	**205** = 205A—150 hp, 110 kW
310 = 310A—125 hp, 90 kW	**261** = 261A—200 hp, 132 kW
	310 = 310A—250 hp, 160 kW

Notes

All boards are varnished (conformed coated). Corrosion resistant.
Battery included in all drives for real-time clock.
Keypad kit includes HOA bypass.
Keypad kit includes HOA, back reset for Europe application.
EMI/RFI filters included.
DC link choke included.

① DB chopper standard frames FS4–FS6. 1.5–40 hp, 3.4–61 amp, 480 Vac; 0.75–20 hp, 3.7–62 amp, 200–240 Vac.

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Product Selection

H-Max Series Drives—230 Vac

NEMA Type 1

NEMA Type 1/IP21

FS Frame Size	Drive Output Current Low Overload Full Load Amps at 40°C	Horsepower	Assigned Motor Ratings Drive kW 230 Vac/50 Hz	230 Vac NEC Amps ①	Low Overload Full Load Amps at 50°C	Catalog Number
4	3.7	0.75	0.55	3.2	2.6	**HMX32AG3D721-B** ②
	4.8	1	0.75	4.2	3.7	**HMX32AG4D821-B** ②
	6.6	1.5	1.1	6.6	4.8	**HMX32AG6D621-B** ②
	8	2	1.5	6.8	6.6	**HMX32AG8D021-B** ②
	11	3	2.2	9.6	8	**HMX32AG01121-B** ②
	12.5	4	3	N/A	11	**HMX32AG01221-B** ②
5	18	5	4	15.2	12.5	**HMX32AG01821-B** ②
	24	7.5	5.5	22	18	**HMX32AG02421-B** ②
	31	10	7.5	28	24	**HMX32AG03121-B** ②
6	48	15	11	42	31	**HMX32AG04821-B** ②
	62	20	15	54	48	**HMX32AG06221-B** ②
7	75	25	18.5	68	62	**HMX32AG07521-N**
	88	30	22	80	75	**HMX32AG08821-N**
	105	40	30	104	88	**HMX32AG10521-N**
8	140	50	37	130	105	**HMX32AG14021-N**
	170	60	45	154	140	**HMX32AG17021-N**
	205	75	55	192	170	**HMX32AG20521-N**
9	261	100	75	248	205	**HMX32AG26121-N**
	310	125	90	N/A	261	**HMX32AG31021-N**

NEMA Type 12

NEMA Type 12/IP54

FS Frame Size	Drive Output Current Low Overload Full Load Amps at 40°C	Horsepower	Assigned Motor Ratings Drive kW 230 Vac/50 Hz	230 Vac NEC Amps ①	Low Overload Full Load Amps at 50°C	Catalog Number
4	3.7	0.75	0.55	3.2	2.6	**HMX32AG3D722-B** ②
	4.8	1	0.75	4.2	3.7	**HMX32AG4D822-B** ②
	6.6	1.5	1.1	6.6	4.8	**HMX32AG6D622-B** ②
	8	2	1.5	6.8	6.6	**HMX32AG8D022-B** ②
	11	3	2.2	9.6	8	**HMX32AG01122-B** ②
	12.5	4	3	N/A	11	**HMX32AG01222-B** ②
5	18	5	4	15.2	12	**HMX32AG01822-B** ②
	24	7.5	5.5	22	18	**HMX32AG02422-B** ②
	31	10	7.5	28	24	**HMX32AG03122-B** ②
6	48	15	11	42	31	**HMX32AG04822-B** ②
	62	20	15	54	48	**HMX32AG06222-B** ②
7	75	25	18.5	68	62	**HMX32AG07522-N**
	88	30	22	80	75	**HMX32AG08822-N**
	105	40	30	104	88	**HMX32AG10522-N**
8	140	50	37	130	105	**HMX32AG14022-N**
	170	60	45	154	140	**HMX32AG17022-N**
	205	75	55	192	170	**HMX32AG20522-N**
9	261	100	75	248	205	**HMX32AG26122-N**
	310	125	90	N/A	261	**HMX32AG31022-N**

Notes

① For sizing reference.

② DB chopper standard frames FS4–FS6. 0.75–20 hp, 3.7–62 amp, 200–240 Vac.

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H-Max Series Drives—480 Vac

NEMA Type 1

NEMA Type 1/IP21

FS Frame Size	Drive Output Current Low Overload Full Load Amps at 40°C	Horsepower	Assigned Motor Ratings Drive kW 400 Vac/50 Hz	480 Vac NEC Amps ①	Low Overload Full Load Amps at 50°C	Catalog Number
4	3.4	1.5	1.1	2.1	2.6	**HMX34AG3D421-B** ②
	4.8	2	1.5	3.4	3.4	**HMX34AG4D821-B** ②
	5.6	3	2.2	5.6	4.8	**HMX34AG5D621-B** ②
	8.0	4	3.0	N/A	5.6	**HMX34AG8D021-B** ②
	9.6	5	4	7.6	8	**HMX34AG9D621-B** ②
	12	7.5	5.5	11	9.6	**HMX34AG01221-B** ②
5	16	10	7.5	14	12	**HMX34AG01621-B** ②
	23	15	11	21	16	**HMX34AG02321-B** ②
	31	20	15	27	23	**HMX34AG03121-B** ②
6	38	25	18.5	34	31	**HMX34AG03821-B** ②
	46	30	22	40	38	**HMX34AG04621-B** ②
	61	40	30	52	46	**HMX34AG06121-B** ②
7	72	50	37	65	61	**HMX34AG07221-N**
	87	60	45	77	72	**HMX34AG08721-N**
	105	75	55	96	87	**HMX34AG10521-N**
8	140	100	75	124	105	**HMX34AG14021-N**
	170	125	90	156	140	**HMX34AG17021-N**
	205	150	110	180	170	**HMX34AG20521-N**
9	261	200	132	240	205	**HMX34AG26121-N**
	310	250	160	302	261	**HMX34AG31021-N**

NEMA Type 12

NEMA Type 12/IP54

FS Frame Size	Drive Output Current Low Overload Full Load Amps at 40°C	Horsepower	Assigned Motor Ratings Drive kW 400 Vac/50 Hz	480 Vac NEC Amps ①	Low Overload Full Load Amps at 50°C	Catalog Number
4	3.4	1.5	1.1	2.1	2.6	**HMX34AG3D422-B** ②
	4.8	2	1.5	3.4	3.4	**HMX34AG4D822-B** ②
	5.6	3	2.2	5.6	4.8	**HMX34AG5D622-B** ②
	8.0	4	3.0	N/A	5.6	**HMX34AG8D022-B** ②
	9.6	5	4	7.6	8	**HMX34AG9D622-B** ②
	12	7.5	5.5	11	9.6	**HMX34AG01222-B** ②
5	16	10	7.5	14	12	**HMX34AG01622-B** ②
	23	15	11	21	16	**HMX34AG02322-B** ②
	31	20	15	27	23	**HMX34AG03122-B** ②
6	38	25	18.5	34	31	**HMX34AG03822-B** ②
	46	30	22	40	38	**HMX34AG04622-B** ②
	61	40	30	52	46	**HMX34AG06122-B**
7	72	50	37	65	61	**HMX34AG07222-N**
	87	60	45	77	72	**HMX34AG08722-N**
	105	75	55	96	87	**HMX34AG10522-N**
8	140	100	75	124	105	**HMX34AG14022-N**
	170	125	90	156	140	**HMX34AG17022-N**
	205	150	110	180	170	**HMX34AG20522-N**
9	261	200	132	240	205	**HMX34AG26122-N**
	310	250	160	302	261	**HMX34AG31022-N**

Notes

① For sizing reference.

② DB chopper standard frames FS4–FS6. 1.5–40 hp, 3.4–61 amp, 480 Vac.

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Onboard Network Communications

Johnson Controls Metasys N2

H-Max Series provides communication between the drive and a Johnson Controls Metasys™ N2 network. With this connection, the drive can be controlled, monitored and programmed from the Metasys system. N2 can be selected and programmed by the drive keypad.

BACnet

H-Max Series provides communication to BACnet networks. Data transfer is master-slave/token passing (MS/TP) RS-485.

BACnet IP

100 base T interface.

Modbus TCP

Ethernet based protocol.

Modbus RTU

H-Max Series provides communication to Modbus RTU RS-485 as a slave on a Modbus network. Other communication parameters include an address range from 1–247; a parity of None, Odd or Even; and the stop bit is 1.

FLN

H-Max Series provides communication to Siemens APOGEE™ FLN (P1) RTU RS-485 as a slave on an FLN network. Other communication parameters include an address range from 1–247, a parity of None, Odd or Even and option boards.

H-Max Series Option Board Kits Available for Slots D and E

The H-Max Series drives can accommodate a wide selection of expander and adapter option boards to customize the drive for your application needs. The drive's control unit is designed to accept a total of two option boards.

The H-Max Series factory-installed standard board configuration includes an I/O board and a relay output board.

Option Boards Mounted in Slots D and E

Option Kit Description	Option Kit Catalog Number
6 x DI /DO, each digital input can be individually programmed as digital output	**XMX-IO-B1-A**
1RO Form C (NO/NC), 1RO Form A (NO), 1 thermistor	**XMX-IO-B2-A**
1 x AI, 2 x AO (isolated)	**XMX-IO-B4-A**
3 x RO Form A (NO)	**XMX-IO-B5-A**
1 ext +24 Vdc/ext +24 Vdc, 3 Pt100	**XMX-IO-B8-A**
1RO Form A (NO), 5DI 42–240 Vac input	**XMX-IO-B9-A**
LonWorks®	**XMX-COM-C4-A**

NEMA Type 1 to NEMA Type 12/IP54 Conversion Kit

The NEMA Type 12/IP54 option kit is used to convert a NEMA Type 1 to a NEMA Type 12 drive.

Kit consists of a drive cover, fan kit and plugs.

NEMA Type 12/IP54 Cover

Option Kit Description	Option Kit Catalog Number
FS4-branded N12/IP54 cover with gasket, plastic plug, fans, Eaton logos	**FS4-N12KIT**
FS5-branded N12/IP54 cover with gasket, plastic plug, fans, Eaton logos	**FS5-N12KIT**
FS6-branded N12/IP54 cover with gasket, plastic plug, fans, Eaton logos	**FS6-N12KIT**

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Flange Kits

The flange kit is used when the power section heat sink is mounted through the back panel of an enclosure.

Flange Kit NEMA Type 1/IP21

Includes flange, mounting brackets, and screws.

Frames FS4–FS9 ①

Description	Catalog Number
NEMA Type 1/IP21	
FS4 N1/IP21 flange kit (fan not needed) (mounting N1 drive in N1 enclosure)	**FS4-Flange-N1KIT**
FS5 N1/IP21 flange kit (fan not needed) (mounting N1 drive in N1 enclosure)	**FS5-Flange-N1KIT**
FS6 N1/IP21 flange kit (fan not needed) (mounting N1 drive in N1 enclosure)	**FS6-Flange-N1KIT**
FS7 N1/IP21 flange kit (fan not needed) (mounting N1 drive in N1 enclosure)	**FS7-Flange-N1KIT**
FS8 N1/IP21 flange kit (fan not needed) (mounting N1 drive in N1 enclosure)	**FS8-Flange-N1KIT**
FS9 N1/IP21 flange kit (fan not needed) (mounting N1 drive in N1 enclosure)	**FS9-Flange-N1KIT**

Flange Kit NEMA Type 12/IP54

Includes flange, mounting brackets, NEMA Type 12 fan components, air shroud screws and plugs.

Frames FS4–FS9 ②

Description	Catalog Number
NEMA Type 12/IP54	
FS4 N12/IP54 flange kit (mounting N1 drive into N12 enclosure)	**FS4-Flange-N12KIT**
FS5 N12/IP54 flange kit (mounting N1 drive into N12 enclosure)	**FS5-Flange-N12KIT**
FS6 N12/IP54 flange kit (mounting N1 drive into N12 enclosure)	**FS6-Flange-N12KIT**
FS7 N12/IP54 flange kit (mounting N1 drive into N12 enclosure)	**FS7-Flange-N12KIT**
FS8 N12/IP54 flange kit (mounting N1 drive into N12 enclosure)	**FS8-Flange-N12KIT**
FS9 N12/IP54 flange kit (mounting N1 drive into N12 enclosure)	**FS9-Flange-N12KIT**

H-Max Series Drive Demo

Demos and Power Supply

Description	Catalog Number
H-Max Series drive demo	**H-MAX-DEMO**
H-Max Series bypass demo	**H-MAX-BYPASS-DEMO**
Hand-held 24V auxiliary power supply—used to supply power to the control module in order to perform keypad programming before the drive is connected to line voltage	**9000XAUX24V**

Notes

① For installation of a NEMA Type 1 drive into a NEMA Type 1 oversized enclosure.
② For installation of a NEMA Type 1 drive into a NEMA Type 12 oversized enclosure.

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Replacement Parts

Control Board/Keypad

Description	Current Catalog Number
Main H-Max Series control board, without relay board	**H-Max-Control Board**
H-Max Series graphic bypass, HOA	**KeypadbypassHOA**
H-Max Series graphic back, HOA	**KeypadbackHOA**
Remote keypad kits (includes bypass keypad overlay, N12 bezel, cables)	**OPTRMT-BP-Hmax**

PC Cable

Description	Catalog Number
Remote download USB to RJ-45 cable with software driver disk	**REM-USB-Down**

Replacement Relay Board in Slot B

Description	Catalog Number
Replacement relay board qty 2 Form C relay, qty 1 Form A relay	**Relay board 1**

Fans

Description	Catalog Number
230 Vac	
FS4-230 Vac replacement fan	**FS4-Fan-230**
FS5-230 Vac replacement fan	**FS5-Fan-230**
FS6-230 Vac replacement fan	**FS6-Fan-230**
FS7-230 Vac replacement fan	**FS7-Fan-230**
FS8-230 Vac replacement fan	**FS8-Fan-230**
FS9-230 Vac replacement fan	**FS9-Fan-230**
480 Vac	
FS4-460 Vac replacement fan	**FS4-Fan-480**
FS5-460 Vac replacement fan	**FS5-Fan-480**
FS6-460 Vac replacement fan	**FS6-Fan-480**
FS7-460 Vac replacement fan	**FS7-Fan-480**
FS8-460 Vac replacement fan	**FS8-Fan-480**
FS9-460 Vac replacement fan	**FS9-Fan-480**

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Technical Data and Specifications

H-Max Series Drives

Description	Specification
Input Ratings	
Input voltage (V_{in})	200–240 Vac, 380–480 Vac, –10%/+10%
Input frequency (f_{in})	50/60 Hz (variation up to 47–66 Hz)
Connection to power	Once per minute or less (typical operation)
Short circuit withstand rating	100 kAIC
Output Ratings	
Output voltage	0 to V_{in}/U_{in} line voltage in
Continuous output current	Ambient temperature max. 104°F (40°C)
I_L overload	1.1 x I_L (1 min./10 min.)
Overload current	110% (1 min./10 min.)
Initial output current	150% for two seconds
Output frequency	0 to 320 Hz
Frequency resolution	0.01 Hz
Control Characteristics	
Control method	Frequency control (V/f) open loop sensorless vector control
Switching frequency	1–310 amps FS4–9: default 6 kHz
Frequency reference	Analog input: Resolution 0.1% (10-bit), accuracy ±1% Panel reference: Resolution 0.01 Hz
Field weakening point	8 to 320 Hz
Acceleration time	0.1 to 3000 seconds
Deceleration time	0.1 to 3000 seconds
Braking torque	DC brake: 30% x T_n (without brake option)
Ambient Conditions	
Ambient operating temperature	FS4–FS9: 14°F (–10°C), no frost to 104°F (40°C) (Drive can operate at 122°F (50°C), see **Pages V6-T36-141** and **V6-T36-142**)
Storage temperature	–40° to 158°F (–40° to 70°C)
Relative humidity	0 to 95% RH, noncondensing, non-corrosive, no dripping water
Air quality	Chemical vapors: IEC 60721-3-3, unit in operation, Class 3C2; Mechanical particles: IEC 60721-3-3, unit in operation, Class 3S2
Altitude	100% load capacity (no derating) up to 3280 ft (1000m); 1% derating for each 328 ft (100m) above 3280 ft (1000m); max. 9842 ft (3000m); 380–480V
Vibration	FS4–FS9: EN 61800-5-1, EN 60068-2-6; 5 to 150 Hz, displacement amplitude 1 mm (peak) at 5 to 15.8 Hz, max. acceleration amplitude 1G at 15.8 to 150 Hz
Shock	EN 61800-5-1, EN 60068-2-27 UPS Drop test (for applicable UPS weights) Storage and shipping: max. 15G, 11 ms (in package)
Enclosure class	NEMA Type 1/IP21 or NEMA Type 12/IP54 (keypad required for IP54/Type 12)
Standards	
EMC	Immunity: Fulfills all EMC immunity requirements; Emissions: EN 61800-3, LEVEL H (EMC C2)
Emissions	EMC level dependent— +EMC 2: EN61800-3 (2004) Category C2 Delivered with Class C2 EMC filtering as default.

Description	Specification
Control Connections	
Analog input voltage	0 to 10V, R = 200 kohms differential Resolution 0.1%; Accuracy ±1% Dip switch selection (voltage/current)
Analog input current	0(4) to 20 mA; R_i –250 ohms differential
Digital inputs (6)	Positive or negative logic; 18 to 30 Vdc
Auxiliary voltage	+24V ±10%, max. 250 mA
Output reference voltage	+10V +3%, max. load 10 mA
Analog output	0–10V, 0(4) to 20 mA; R_L max. 500 ohms; Resolution 10 bit; Accuracy ±2% Dip switch selection (voltage/current)
Relay outputs	3 programmable, 2 Form C, 1 Form A relay outputs Switching capacity: 24 Vdc/8A, 250 Vac/8A, 125 Vdc/0.4A
Hard wire jumper	Between terminal 6 and 10 factory default
Dip switch setting default	RS485 = off A01 = current A12 = current A11 = voltage
Protections	
Overcurrent protection	Yes
Overvoltage protection	Yes
DC bus regulation anti-trip	Yes (accelerates or decelerates the load)
Undervoltage protection	Yes
Earth fault protection	Yes (in case of earth fault in motor or motor cable, only the frequency converter is protected)
Input phase supervision	Yes (trips if any of the input phases are missing)
Motor phase supervision	Yes (trips if any of the output phases are missing)
Overtemperature protection	Yes
Motor overload protection	Yes
Motor stall protection	Yes
Motor underload protection	Yes
Short circuit protection	Yes
Surge protection	Yes (varistor input)
Conformed coated (varnished) boards	Yes (prevents corrosion)
Seismic	
OHSPD Special Seismic Certification Pre-Approved	

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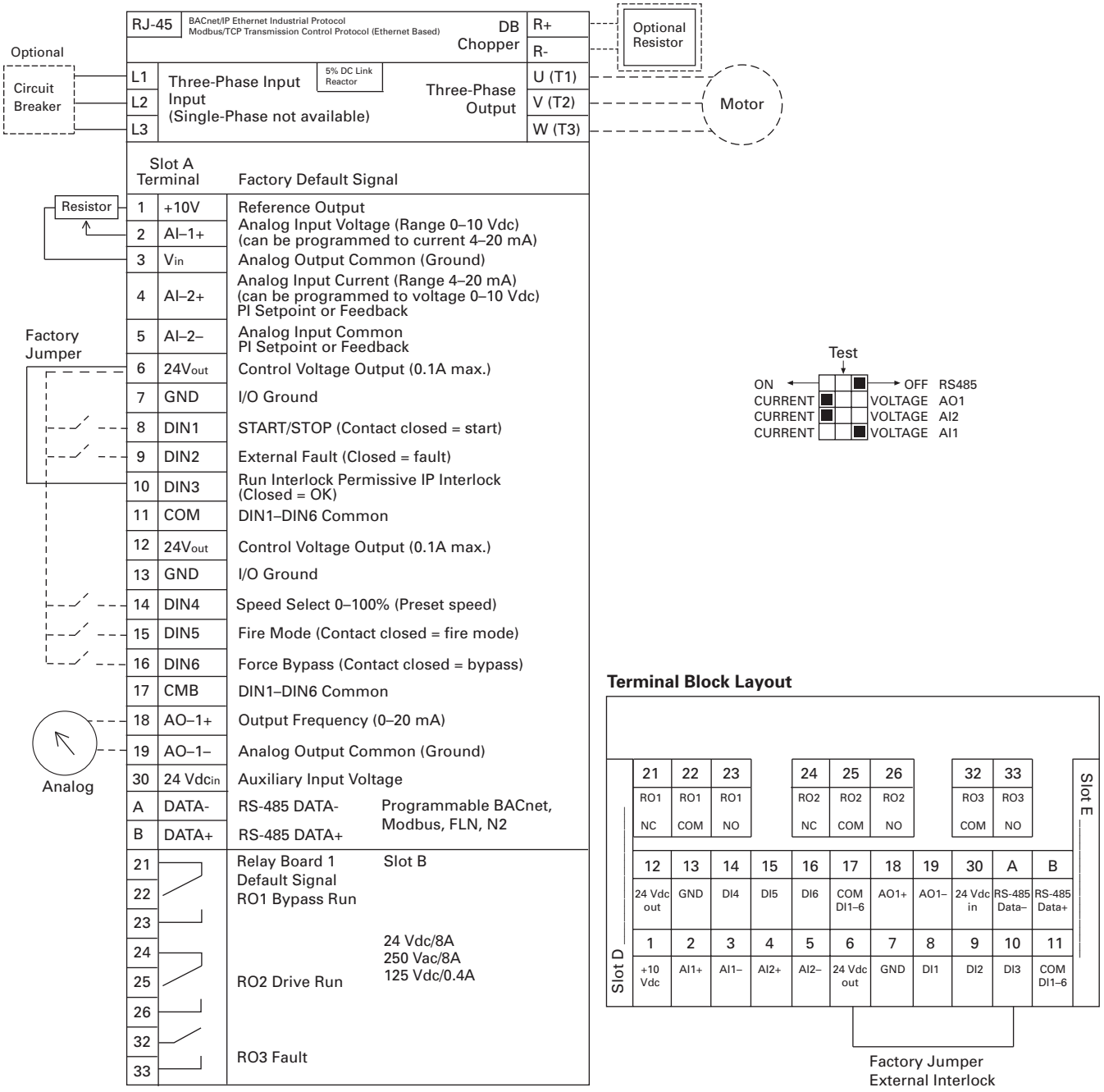
Wiring Diagram

Control Input/Output, PID Application



Terminal Block Layout

Standards

- Digital inputs D1–D6, relay out, analog in/out are freely programmed
- The user can assign a single input to multiple functions

Includes

- Six digital input
- Two analog input
- One analog output
- Three relay output
- RS-485
- Ethernet (BACnet and Modbus)

Reliability

- Pretested components
- Conformal coated (varnished) boards
- 40°C rated
- 110% overload for one minute
- Eaton Electrical Services & Systems national network of AF drive specialists

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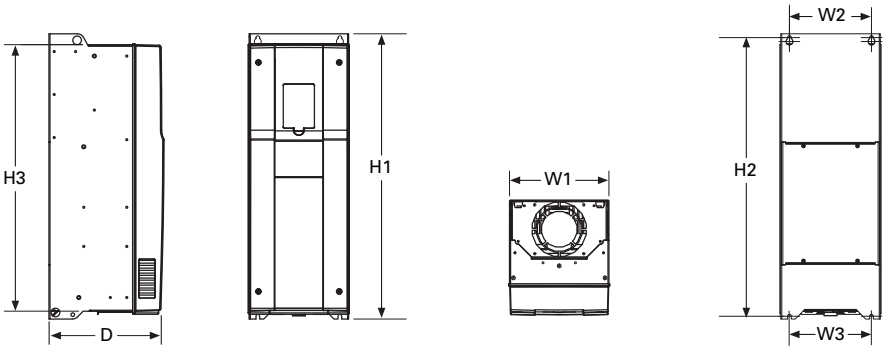
Dimensions

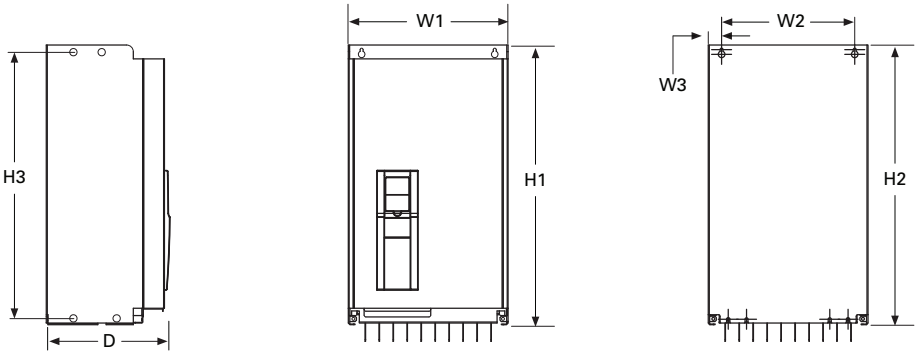
Approximate Dimensions in Inches (mm)

H-Max Series Frames FS4–FS7



Voltage	hp	kW	Amps	D	H1	Hole Center-to-Center H2	H3	W1	W2	W3	Weight in Lbs (kg)
FS4											
230 Vac	0.75–4	0.55–3.0	3.7–12.5	7.77 (197.3)	12.89 (327.5)	12.32 (313.0)	11.22 (285.0)	5.04 (128.0)	3.94 (100.0)	3.94 (100.0)	13.2 (6)
480 Vac	1.5–7.5	1.1–5.5	3.4–12								
FS5											
230 Vac	5–10	4–7.5	18–31	8.73 (221.6)	16.50 (419.0)	15.98 (406.0)	15.04 (382.0)	5.67 (144.0)	4.53 (115.0)	3.94 (100.0)	22.0 (10)
480 Vac	10–20	7.5–15	16–31								
FS6											
230 Vac	15–20	11–15	48–62	9.29 (236.0)	21.93 (557.0)	21.28 (540.5)	20.24 (514.0)	7.68 (195.0)	5.83 (148.0)	5.83 (148.0)	44.1 (20)
480 Vac	25–40	18.5–30	38–61								
FS7											
230 Vac	25–30	18.5–30	75–105	10.49 (266.5)	25.98 (660.0)	25.39 (645.0)	24.29 (617.0)	9.06 (230.0)	7.48 (190.0)	7.48 (190.0)	82.6 (37.5)
480 Vac	50–75	37–55	72–105								

H-Max Series Frames FS8 and FS9



Voltage	hp	kW	Amps	D	H1	Hole Center-to-Center H2	H3	W1	W2	W3	Weight in Lbs (kg)
FS8											
230 Vac	50–75	37–55	140–205	13.76 (349.6)	38.02 (965.7)	37.26 (946.4)	37.26 (946.4)	11.42 (290.1)	9.29 (236.0)	1.42 (36.0)	154.3 (70)
480 Vac	100–150	75–110									
FS9											
230 Vac	100–120	75–90	261–310	14.63 (371.6)	33.09 (890.4)	31.89 (810.0)	31.89 (810.0)	18.90 (480.0)	15.75 (400.0)	1.57 (40.0)	238.1 (108)
480 Vac	200–250	132–160									

Note: For flange dimension, please reference User Manual.

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H-Max IntelliPass and IntelliDisconnect Drives

Contents

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Catalog Number Selection	**V6-T36-150**
Product Selection	**V6-T36-151**
H-Max IntelliPass/IntelliDisconnect	**V6-T36-155**
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H-Max IntelliPass and IntelliDisconnect Drives

Product Description

The IntelliPass electronic bypass is a two or optional three contactor design using a 24 Vdc ***XT*** Series contactor with an optional manual override switch that allows the unit to run in bypass without the H-Max Series drive.

The IntelliPass software parameters utilize engineering units common to the HVAC industry. Onboard startup wizard guarantees flawless commissioning with plug-and-play screen entry. Available in NEMA Type 1 and 12 with optional pre-engineered operator devices to meet all customized specification requirements.

The IntelliPass construction features allow for easy installation, reliable operation and serviceability with additional onboard wire space and removable conduit plates with knockouts.

Features and Benefits

IntelliPass/IntelliDisconnect

- Circuit breaker provides flexible drive isolation configurations to meet customers' needs
- Communication interface enables control of the motor operated by the drive or bypass
- Plenum rated
- Designed and tested to UL 508C specifications
- Standard DC link choke for enhanced transient and harmonic distortion protection
- DC bus regulation anti-trip
- Input surge protection against voltage spikes varistor input
- EMI/RFI filters standard on all drives to meet EMC Category 2
- Top and bottom conduit entry for installation ease
- Pass-through I/O capability
- Additional I/O and communication cards provide plug and play functionality
- Copy/paste keypad function allows transfer of parameter settings from one drive to the next
- Optional fusing—fuse rating 200 kAIC
- Keypad can display up to nine monitored parameters simultaneously
- OHSPD Special Seismic Certification Pre-Approved
- Standard NEMA Type 12 keypad on all drives
- Simplified operating menu allows for typical programming changes
- Accommodates a wide selection of expander boards and adapter boards
- Control logic can be powered from an external auxiliary control panel
- Standard I/O, 6 DI, 2 AI, 1 AO, 2 Form C RO, 1 Form A RO
- Onboard RS-485 (Modbus, N2, FLN, BACnet)
- Built-in Ethernet communication (BACnet/IP, Modbus/TCP)
- DB chopper standard frames FS4–FS6 for USA application.
  - 1.5–40 hp, 2.1–52 amp, 480 Vac
  - 1–20 hp, 4.2–54 amp, 230 Vac
  - 1–20 hp, 4.6–60 amp, 208 Vac
- Hard wired external/damper interlock

IntelliPass

- Fully rated, mechanically interlocked contacts
- HAND/OFF/AUTO and DRIVE/BYPASS selector on keypad simplifies control
- Two power sources for control ensure redundancy and provide additional ride-through capability
- Self-healing power supplies
- Bypass circuit current interrupting rating up to 65 kAIC without fusing
- Fully featured mechanically interlocked bypass featuring Eaton's ***XT*** contactors
- Pre-engineered options to allow custom configurations (see option P150)
- Robust steel enclosure for simple installation
- Programmable auto restart and auto bypass while allowing critical damper interlock functionality

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Standards and Certifications

Product

- IEC 61800-5-1
- CE
- cUL

Safety

- UL 508C
- EN 61800-5-1
- CE
- cUL

- OHSPD Special Seismic Certification Pre-Approved

Catalog Number Selection

H-Max Series IntelliPass and IntelliDisconnect Drives

HMX 011 3 4 B A _ _ _ _ _ _ _ _ _ _

Build options alphabetically and numerically.

Product
HMX = HVAC drive (VT) (low overload)

NEC Ampere Ratings

208 Volts	480 Volts
4D6 = 4.6A—1 hp ①	**2D1** = 2.1A—1 hp ①
7D5 = 7.5A—2 hp ①	**3D4** = 3.4A—2 hp ①
011 = 11A—3 hp ①	**5D6** = 5.6A—3 hp ①
017 = 17A—5 hp ①	**7D6** = 7.6A—5 hp ①
025 = 25A—7.5 hp ①	**011** = 11A—7.5 hp ①
031 = 31A—10 hp ①	**014** = 14A—10 hp ①
047 = 47A—15 hp ①	**021** = 21A—15 hp ①
060 = 60A—20 hp ①	**027** = 27A—20 hp ①
075 = 75A—25 hp	**034** = 34A—25 hp ①
088 = 88A—30 hp	**040** = 40A—30 hp ①
230 Volts	**052** = 52A—40 hp ①
4D2 = 4.2A—1 hp ①	**065** = 65A—50 hp
6D8 = 6.8A—2 hp ①	**077** = 77A—60 hp
9D6 = 9.6A—3 hp ①	**096** = 96A—75 hp
016 = 16A—5 hp ①	
022 = 22A—7.5 hp ①	
028 = 28A—10 hp ①	
042 = 42A—15 hp ①	
054 = 54A—20 hp ①	
068 = 68A—25 hp	
080 = 80A—30 hp	

Enclosure Style
3 = IntelliPass NEMA Type 1
A = IntelliDisconnect NEMA Type 1

Voltage
1 = 208V
2 = 230V
4 = 480V

Braking/Application
N = No brake chopper (low overload)
B = Internal brake chopper (low overload FS4–FS6 included)

Software Series
A–Z

Extended I/O Options in Slot D and E
B1 = 6 x DI /DO, Each digital input can be individually programmed as digital output
B2 = 1RO (NC/NO), 1RO (NO), 1 Thermistor
B4 = 1 x AI, 2 x AO (isolated)
B5 = 3 x RO
B8 = 1 ext +24 Vdc/ext +24 Vdc, 3 Pt100
B9 = 1RO (NO), 5 DI 42–240 Vac input

Optional Communications in Slot D and E
C4 = LonWorks®

EMC Upgrade Option
EMC C2 Standard

Keypad Options
None available

IntelliDisconnect Options
P3 = Fused drive isolation
PE = Output contactor
SA = Space heater w/transformer (Type 3R only)

IntelliPass Bypass Options
P3 = Fused drive isolation (can not be used with P6)
P6 = Third contactor drive isolation
PE = Output contactor (used for IntelliDisconnect)
M1 = Manual bypass switch located on front door
SA = Space heater w/transformer (Type 3R only)
KF = Drive test switch (used only with P6 option)
L1 = Power on and fault light (two separate lights)
L2 = Bypass pilot light (red)
L3 = Manual bypass light (amber)
LE = Drive run light
K9 = Auxiliary contacts
IS = Isolation switch

Standard Onboard Communications

RS-485 Communications

BACnet MS/TP = Master slave/token protocol (Universal BACnet) RS-485
Modbus RTU RS-485, ASCII or RTU, remote terminal unit 32 nodes
FLN Siemens APOGEE FLN (P1) ASCII or RTU, remote terminal unit 32 nodes
N2 = Johnson Controls Metasys N2 network

Onboard Ethernet-Based Communications (port left side of keypad)

BACnet/IP Ethernet industrial protocol
Modbus/TCP Transmission control protocol (Ethernet-based)

Notes

IntelliPass—two contactor electronic bypass standard.

All boards are varnished. Corrosion resistant.

Battery included in all drives for real-time clock. Three year lifetime.

Keypad kit includes HOA bypass.

EMI/RFI filters included.

DC link choke included.

① DB chopper standard frames FS4–FS6 for USA application. 1.5–40 hp, 2.1–52 amp, 480 Vac; 1–20 hp, 4.2–54 amp, 230 Vac; 1–20 hp, 4.6–60 amp, 208 Vac.

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Product Selection

H-Max Series IntelliPass NEMA Type 1—Two Contactor Bypass Standard

HMX_

208 Vac

FS Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
4	1	4.6	**HMX4D631BA**
	2	7.5	**HMX7D531BA**
	3	10.6	**HMX01131BA**
5	5	16.7	**HMX01731BA**
	7.5	24.2	**HMX02531BA**
	10	30.8	**HMX03131BA**
6	15	46.2	**HMX04731BA**
	20	59.4	**HMX06031BA**
7	25	74.9	**HMX07531NA**
	30	88	**HMX08831NA**

230 Vac

FS Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
4	1	4.2	**HMX4D232BA**
	2	6.8	**HMX6D832BA**
	3	9.6	**HMX9D632BA**
5	5	15.2	**HMX01632BA**
	7.5	22	**HMX02232BA**
	10	28	**HMX02832BA**
6	15	42	**HMX04232BA**
	20	54	**HMX05432BA**
7	25	68	**HMX06832NA**
	30	80	**HMX08032NA**

480 Vac

FS Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
4	1	2.1	**HMX2D134BA**
	2	3.4	**HMX3D434BA**
	3	5.6	**HMX5D634BA**
	5	9.6	**HMX7D634BA**
	7.5	11	**HMX01134BA**
5	10	14	**HMX01434BA**
	15	21	**HMX02134BA**
	20	27	**HMX02734BA**
6	25	34	**HMX03434BA**
	30	40	**HMX04034BA**
	40	52	**HMX05234BA**
7	50	65	**HMX06534NA**
	60	77	**HMX07734NA**
	75	96	**HMX09634NA**

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H-Max Series IntelliDisconnect NEMA Type 1—Main Disconnect Standard

HMX_

208 Vac

FS Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
4	1	4.6	**HMX4D6A1BA**
	2	7.5	**HMX7D5A1BA**
	3	11	**HMX011A1BA**
5	5	17	**HMX017A1BA**
	7.5	25	**HMX025A1BA**
	10	31	**HMX031A1BA**
6	15	47	**HMX047A1BA**
	20	60	**HMX060A1BA**
7	25	75	**HMX075A1NA**
	30	88	**HMX088A1NA**

230 Vac

FS Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
4	1	4.2	**HMX4D2A2BA**
	2	6.8	**HMX6D8A2BA**
	3	9.6	**HMX9D6A2BA**
5	5	15.2	**HMX016A2BA**
	7.5	22	**HMX022A2BA**
	10	28	**HMX028A2BA**
6	15	42	**HMX042A2BA**
	20	54	**HMX054A2BA**
7	25	68	**HMX068A2NA**
	30	80	**HMX080A2NA**

480 Vac

FS Frame Size	Horsepower	Drive Rated NEC Amps	Catalog Number
4	1	2.1	**HMX2D1A4BA**
	2	3.4	**HMX3D4A4BA**
	3	5.6	**HMX5D6A4BA**
	5	9.6	**HMX7D6A4BA**
	7.5	11	**HMX011A4BA**
5	10	14	**HMX014A4BA**
	15	21	**HMX021A4BA**
	20	27	**HMX027A4BA**
6	25	34	**HMX034A4BA**
	30	40	**HMX040A4BA**
	40	52	**HMX052A4BA**
7	50	65	**HMX065A4NA**
	60	77	**HMX077A4NA**
	75	96	**HMX096A4NA**

Note

For Wiring Diagrams, see **Page V6-T36-157**.

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Onboard Network Communications

Johnson Controls Metasys N2

H-Max Series provides communication between the drive and a Johnson Controls Metasys™ N2 network. With this connection, the drive can be controlled, monitored and programmed from the Metasys system. N2 can be selected and programmed by the drive keypad.

BACnet

H-Max Series provides communication to BACnet networks. Data transfer is master-slave/token passing (MS/TP) RS-485.

BACnet IP

100 base T interface.

Modbus TCP

Ethernet based protocol.

Modbus RTU

H-Max Series provides communication to Modbus RTU RS-485 as a slave on a Modbus network. Other communication parameters include an address range from 1–247; a parity of None, Odd or Even; and the stop bit is 1.

FLN

H-Max Series provides communication to Siemens APOGEE™ FLN (P1) RTU RS-485 as a slave on an FLN network. Other communication parameters include an address range from 1–247, a parity of None, Odd or Even and option boards.

H-Max Series Option Board Kits Available for Slots D and E

The H-Max Series drives can accommodate a wide selection of expander and adapter option boards to customize the drive for your application needs. The drive's control unit is designed to accept a total of two option boards.

The H-Max Series factory-installed standard board configuration includes an I/O board and a relay output board.

Option Boards Mounted in Slots D and E

Option Kit Description	Option Kit Catalog Number
6 x DI /DO, each digital input can be individually programmed as digital output	**XMX-IO-B1-A**
1RO Form C (NO/NC), 1RO Form A (NO), 1 thermistor	**XMX-IO-B2-A**
1 x AI, 2 x AO (isolated)	**XMX-IO-B4-A**
3 x RO Form A (NO)	**XMX-IO-B5-A**
1 ext +24 Vdc/ext +24 Vdc, 3 Pt100	**XMX-IO-B8-A**
1RO Form A (NO), 5DI 42–240 Vac input	**XMX-IO-B9-A**
LonWorks®	**XMX-COM-C4-A**

NEMA Type 12/IP54 Conversion Kit

The NEMA Type 12/IP54 option kit is used to convert a NEMA Type 1 to a NEMA Type 12 drive.

Kit consists of a drive cover, fan kit and plugs.

NEMA Type 12/IP54 Cover

Option Kit Description	Option Kit Catalog Number
FS4-branded N12/IP54 cover with gasket, plastic plug, fans, Eaton logos	**FS4-N12KIT**
FS5-branded N12/IP54 cover with gasket, plastic plug, fans, Eaton logos	**FS5-N12KIT**
FS6-branded N12/IP54 cover with gasket, plastic plug, fans, Eaton logos	**FS6-N12KIT**
FS7-branded N12/IP54 cover with gasket, plastic plug, fans, Eaton logos	**FS7-N12KIT**
FS8-branded N12/IP54 cover with gasket, plastic plug, fans, Eaton logos	**FS8-N12KIT**
FS9-branded N12/IP54 cover with gasket, plastic plug, fans, Eaton logos	**FS9-N12KIT**

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Third Contactor Drive Isolation

Horsepower at 208 and 230 Vac	Suffix Number ①②	Horsepower at 480 Vac	Suffix Number ①②	Horsepower at 480 Vac	Suffix Number ①②
1–3	**P6**	1–7.5	**P6**	40	**P6**
5–7.5	**P6**	10–15	**P6**	50	**P6**
10	**P6**	20	**P6**	60	**P6**
15	**P6**	25	**P6**	75	**P6**
20	**P6**	30	**P6**		
25	**P6**				
30	**P6**				

Drive Isolation Service Switch

Horsepower at 208 and 230 Vac	Suffix Number ①	Horsepower at 480 Vac	Suffix Number ①	Horsepower at 480 Vac	Suffix Number ①
1–3	**IS**	1–7.5	**IS**	40	**IS**
5–7.5	**IS**	10–15	**IS**	50	**IS**
10	**IS**	20	**IS**	60	**IS**
15	**IS**	25	**IS**	75	**IS**
20	**IS**	30	**IS**		
25	**IS**				
30	**IS**				

Output Contactor Used for IntelliDisconnect

Horsepower at 208 and 230 Vac	Suffix Number①③	Horsepower at 480 Vac	Suffix Number ①③	Horsepower at 480 Vac	Suffix Number ①③
1–3	**PE**	1–7.5	**PE**	40	**PE**
5–7.5	**PE**	10–15	**PE**	50	**PE**
10	**PE**	20	**PE**	60	**PE**
15	**PE**	25	**PE**	75	**PE**
20	**PE**	30	**PE**		
25	**PE**				
30	**PE**				

Auxiliary Contacts

Horsepower at 208/230 Vac	Description	Suffix Number ④	Horsepower at 480 Vac	Description	Suffix Number ④
1–30	Factory installed	**K9**	1–75	Factory installed	**K9**

Optional Operator Devices

Description	Suffix Number ④	Description	Suffix Number ④
Bypass test switch (used with third contactor isolation switch)	**KF**	Manual bypass light (amber)	**L3**
		Drive run (red) pilot light	**LE**
Power on (green), fault (red) pilot lights	**L1**	Manual bypass switch located on door	**M1**
Bypass (red) pilot light	**L2**		

Drive Isolation Input Fusing

Horsepower at 208 and 230 Vac	Suffix Number ①②	Horsepower at 480 Vac	Suffix Number ①②	Horsepower at 480 Vac	Suffix Number ①②
1–3	**P3**	1–7.5	**P3**	40	**P3**
5–7.5	**P3**	10–15	**P3**	50	**P3**
10	**P3**	20	**P3**	60	**P3**
15	**P3**	25	**P3**	75	**P3**
20	**P3**	30	**P3**		
25	**P3**				
30	**P3**				

Notes

① Fused drive isolation (P3) and third contactor (P6) or drive isolation switch (IS) cannot be installed together.
② P6 option not available with IntelliDisconnect.
③ PE option only available with IntelliDisconnect.
④ K9 option only available with IntelliPass drives.

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H-Max IntelliPass/IntelliDisconnect

Primary Design Features

Description	IntelliPass	IntelliDisconnect
CB MMP	Standard	Standard
2 contactor bypass	Standard	N/A
Mechanical interlock	Standard	N/A
Electrical interlock	Standard	N/A
Third contactor (isolation)	Optional	N/A
Isolation switch	Optional	N/A
Top entry (power)	Standard	Standard
Bottom entry (power)	Standard	Standard
Output contactor	Standard	Optional

Technical Data and Specifications

H-Max Series Drives

Description	Specification
Input Ratings	
Input voltage (V_{in})	208, 230, 480 Vac, –10%/+10%
Input frequency (f_{in})	50/60 Hz (variation up to 47–66 Hz)
Connection to power	Once per minute or less (typical operation)
Short circuit withstand rating	65 kAIC combination
Output Ratings	
Output voltage	0 to V_{in}/U_{in} line voltage in
Continuous output current	Ambient temperature max. 104°F (40°C)
I_L overload	1.1 x I_L (1 min./10 min.)
Overload current	110% (1 min./10 min.)
Initial output current	150% for two seconds
Output frequency	0 to 320 Hz
Frequency resolution	0.01 Hz
Control Characteristics	
Control method	Frequency control (V/f) open loop sensorless vector control
Switching frequency	1–310 amps; adjustable with parameter 2.6.9 FS4–FS7: default 6 kHz
Frequency reference	Analog input: Resolution 0.1% (10-bit), accuracy ±1% Panel reference: Resolution 0.01 Hz
Field weakening point	8 to 320 Hz
Acceleration time	0.1 to 3000 seconds
Deceleration time	0.1 to 3000 seconds
Braking torque	DC brake: 30% x T_n (without brake option)
Ambient Conditions	
Ambient operating temperature	FS4–FS7: 14°F (–10°C), no frost to 104°F (40°C) (Drive can operate at 122°F (50°C)
Storage temperature	–40° to 158°F (–40° to 70°C)
Relative humidity	0 to 95% RH, noncondensing, non-corrosive, no dripping water
Air quality	Chemical vapors: IEC 60721-3-3, unit in operation, Class 3C2; Mechanical particles: IEC 60721-3-3, unit in operation, Class 3S2
Altitude	100% load capacity (no derating) up to 3280 ft (1000m); 1% derating for each 328 ft (100m) above 3280 ft (1000m); max. 9842 ft (3000m); 380–480V
Vibration	FS4–FS7: EN 61800-5-1, EN 60068-2-6; 5 to 150 Hz, displacement amplitude 1 mm (peak) at 5 to 15.8 Hz, max. acceleration amplitude 1G at 15.8 to 150 Hz
Shock	EN 61800-5-1, EN 60068-2-27 UPS Drop test (for applicable UPS weights) Storage and shipping: max. 15G, 11 ms (in package)
Enclosure class	NEMA Type 1/IP21 or NEMA Type 12/IP54 (keypad required for IP54/Type 12)

Description	Specification
Standards	
EMC	Immunity: Fulfills all EMC immunity requirements; Emissions: EN 61800-3, LEVEL H (EMC C2)
Emissions	EMC level dependent— +EMC 2: EN61800-3 (2004) Category C2 Delivered with Class C2 EMC filtering as default.
Control Connections	
Analog input voltage	0 to 10V, R = 200 kohms differential Resolution 0.1%; Accuracy ±1% Dip switch selection (voltage/current)
Analog input current	0(4) to 20 mA; R_i –250 ohms differential
Digital inputs (6)	Positive or negative logic; 18 to 30 Vdc
Auxiliary voltage	+24V ±10%, max. 250 mA
Output reference voltage	+10V +3%, max. load 10 mA
Analog output	0–10V, 0(4) to 20 mA; R_L max. 500 ohms; Resolution 10 bit; Accuracy ±2%; Dip switch selection (voltage/current)
Relay outputs	3 programmable, 2 Form C, 1 Form A relay outputs Switching capacity: 24 Vdc/8A, 250 Vac/8A, 125 Vdc/0.4A
Hard wire jumper	Between terminal 6 and 10 factory default
Dip switch setting default	RS485 = off A01 = current A12 = current A11 = voltage
Protections	
Overcurrent protection	Yes
Overvoltage protection	Yes
DC bus regulation anti-trip	Yes (accelerates or decelerates the load)
Undervoltage protection	Yes
Earth fault protection	Yes (in case of earth fault in motor or motor cable, only the frequency converter is protected)
Input phase supervision	Yes (trips if any of the input phases are missing)
Motor phase supervision	Yes (trips if any of the output phases are missing)
Overtemperature protection	Yes
Motor overload protection	Yes
Motor stall protection	Yes
Motor underload protection	Yes
Short circuit protection	Yes
Surge protection	Yes (varistor input)
Conformed coated (varnished) board	Yes (prevents corrosion)
Seismic	
OHSPD Special Seismic Certification Pre-Approved	

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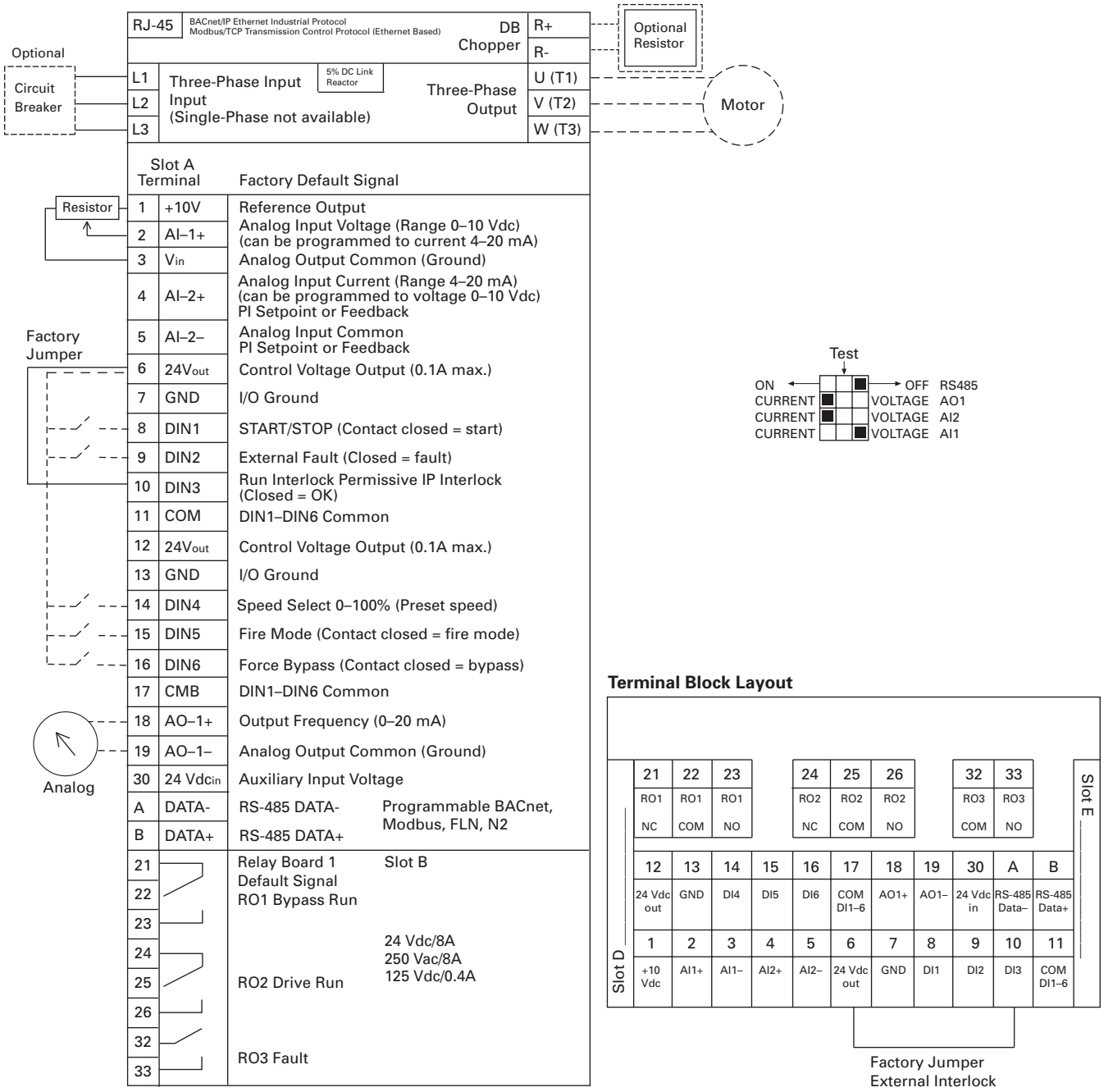
Wiring Diagrams

Control Input/Output, PID Application



Terminal Block Layout

Standards

- Digital inputs D1–D6, relay out, analog in/out are freely programmed
- The user can assign a single input to multiple functions

Includes

- Six digital input
- Two analog input
- One analog output
- Three relay output
- RS-485
- Ethernet

Reliability

- Pretested components
- Conformal coated (varnished) boards
- 40°C rated
- 110% overload for one minute
- Eaton Electrical Services & Systems national network of AF drive specialists

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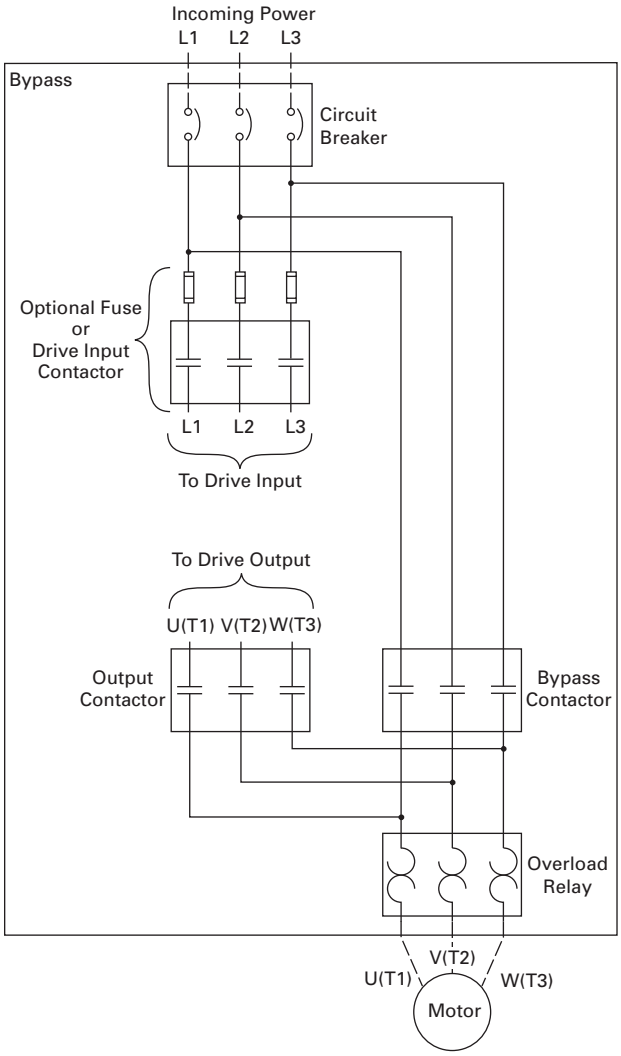
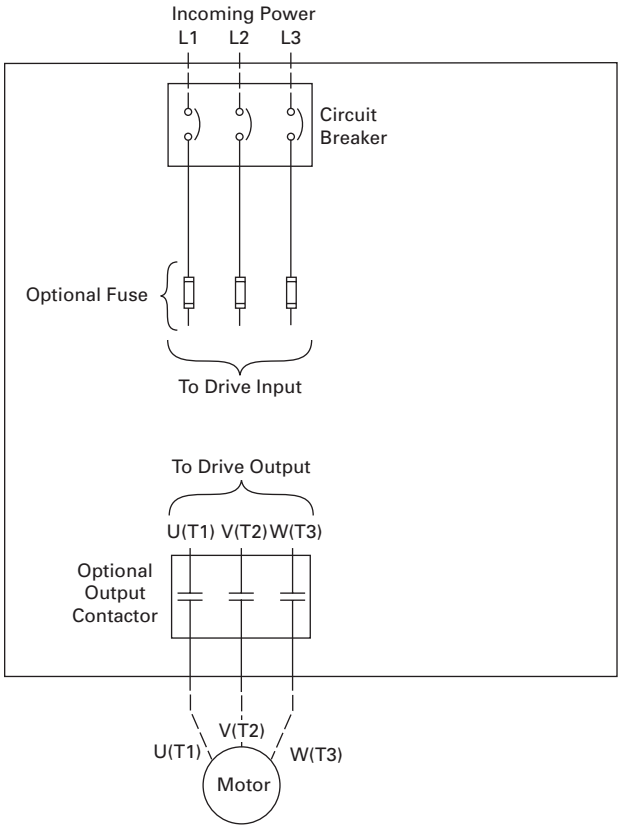
H-Max Series IntelliPass



H-Max Series IntelliDisconnect Power Wiring



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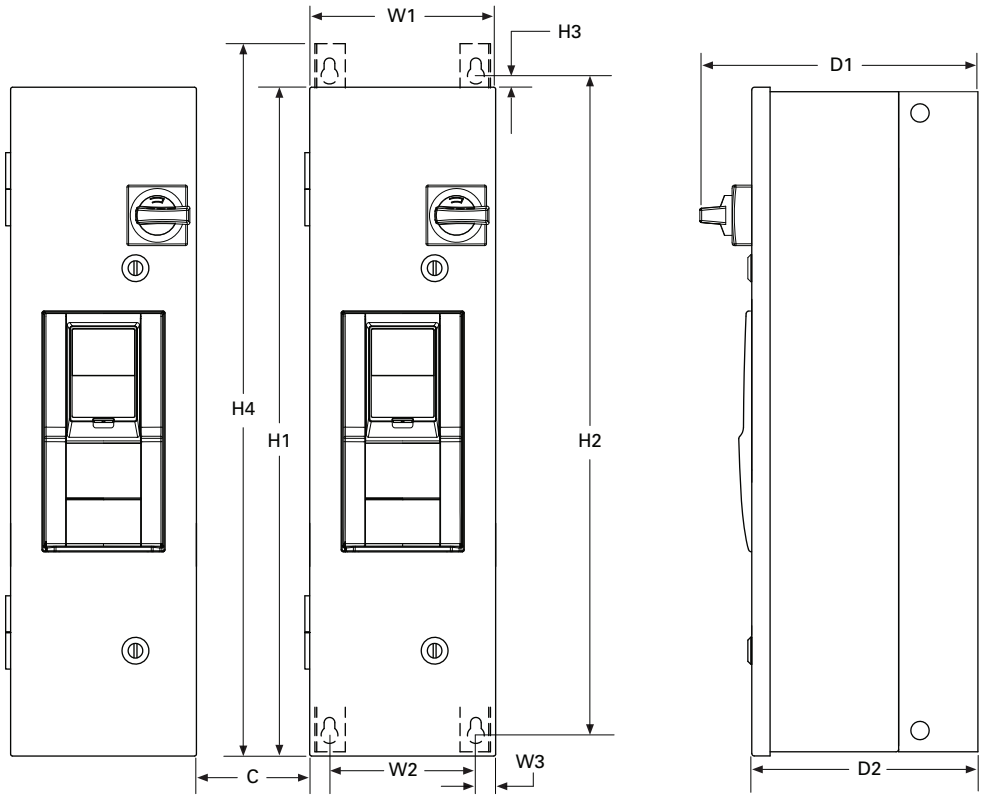
Dimensions

Approximate Dimensions in Inches (mm)

H-Max Series IntelliPass and IntelliDisconnect Drives



Consult factory or use manual for final dimensions.

Frame Size	Voltage	Horsepower (I_L)	H1	H2	H3	H4	C	W1	W2	W3	D1	D2	Weight in Lbs (kg)
FS4	208	1–3	29.69 (754.1)	37.12 (942.9)	0.25 (6.35)	31.00 (914.4)	3.00 (76.2)	7.88 (200.2)	6.33 (160.8)	0.75 (19.1)	11.40 (289.6)	9.27 (235.5)	45 (20.41)
	230	1–3											
	480	1–7.5											
FS5	208	5–10	37.00 (939.8)	34.47 (875.5)	0.25 (6.35)	38.31 (973.0)	3.00 (76.2)	9.40 (238.8)	7.75 (196.9)	0.75 (19.1)	15.30 (388.6)	13.17 (334.6)	57.5 (26.10)
	230	5–10											
	480	10–20											
FS6	208	15–20	45.08 (1145.0)	40.28 (1023.1)	0.25 (6.35)	46.4 (1178.6)	4.00 (101.6)	10.90 (276.9)	9.35 (327.5)	0.75 (19.1)	15.75 (400.0)	13.62 (346.0)	98.0 (44.45)
	230	15–20											
	480	25–40											
FS7	208	25–30	58.32 (1481.3)	56.30 (1430.0)	0.25 (6.35)	59.46 (1510.3)	5.00 (127.0)	13.98 (355.1)	12.35 (313.7)	0.75 (19.1)	15.50 (393.7)	13.55 (244.2)	165.0 (74.84)
	230	25–30											
	480	50–75											

Note: C distance is spacing required to mount multiple drives.

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